UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,453	09/30/2003	Chi-Fu Tito Hsueh		2452

38747 7590 12/04/2006

CHI-FU HSUEH
2275 MONTIA PLACE
ESCONDIDO, CA 92029

EXAMINER
LAZORCIK, JASON L

ART UNIT	PAPER NUMBER
1731	

DATE MAILED: 12/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,453	HSUEH, CHI-FU TITO	
	Examiner	Art Unit	
	Jason L. Lazorcik	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *October 10, 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6-8,11 and 14-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-8,11 and 14-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

The amendment filed October 10, 2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. In the instant case, Applicants amendments as presented in the reply page 2 through page 4 have found no basis **IN THE ORIGINAL SPECIFICATION** paragraphs at least as indicated in the reply. Given the complexity and breadth of revisions presented in the reply, the burden rests upon the applicant to clearly and unambiguously delineate the basis for any and all amendments to the specification and to justify the basis for these changes in the application as originally filed. As an example, on page 3 of the reply applicant indicates an amendment to paragraph 0034 is supported by paragraph 0065 of the original disclosure, however no such numbered paragraph is even present in the original specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 7, 11-12, and 14-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject

matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Specifically, applicant sets forth the limitation in Claims 7 and 14 where the flat pieces are placed in " a refractory mold such that the flat pieces are spaced apart and placed flat upon the floor of the mold" in lines 4-5 and 5-6, respectively. While applicants Example 2 (¶ [0061]-Original Disclosure) provides basis for providing a layer of flat glass pieces on the mold over the mold release agent, one of ordinary skill in the art would not necessarily have been apprised of the details of the limitation as set forth above.

Applicants amendment of Claim 11 to include the limitation wherein the glass bits have "a largest dimension of less than 10 mm" lacks supporting basis in the application as originally filed. It is further understood that one of ordinary skill in the art at the time of the invention would not necessarily have been apprised of such a dimensional limitation upon said crystallizable glass bits.

Further regarding Claim 14, Applicant sets forth the limitation wherein "the glass bits form a layer that will shrink upon heat treatment to cover the flat crystallized glass pieces placed on the floor of the mold by at least 0.5mm" in the instant claim lines 9-10. Similarly, applicant sets forth the limitation in Claim 14, lines 14-16 that "the liquefied glass flows to fill in voids among glass bits and such that the glass plate will have raised portions on the upper surface over the flat pieces that are at least 1 mm high". Where no clear precedent for either of these limitations has been found in the disclosure as

originally filed and since one of ordinary skill in the art would not necessarily have been appraised of the details of said limitation, both limitations of the instant claim are deemed to introduce new matter into the application.

Regarding Claims 15 and 16, the application as originally filed provides no basis for the limitation wherein the glass plate is polished "such that the surfaces of the raised portions over the flat pieces are polished and coplanar, and such that the upper surface of the glass plate between the flat pieces remains unpolished" as set forth in Claim 15. Similarly, the originally presented disclosure provides no basis for the limitation wherein each plat piece has "a decorative outline in top view" as set forth in Claim 16.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1,2,4, 6, 7, 11 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashibe (5,089,345) in view of the combined teachings of Nakamura (3,964,917), Nakamura (3,955989), and Kurahashi (5,403,664).

Regarding Claims 1,2,4, 6, 7, 11 and 14-16, Hashibe teaches a process whereby a glass article having a rough or irregular surface is fabricated by the following steps:

1) Glass balls of less than 10mm diameter (Column 2, Lines 24-25) or "having a largest dimension less than 10 mm" and fabricated from a material capable of forming β -wollastonite crystals(Column 3 Line 22), are prepared composed of (Column 2, Lines 30-31):

1a. SiO_2 of 50-65%
1b. Al_2O_3 of 3-13%
1c. CaO of 15-25%
1d. ZnO of 2-10%

2. Flaky or flattened pieces of a crystallizable glass, also capable of forming β-wollastonite crystals (Column 3, Line 22), are prepared having a thickness of between 0.1-0.5mm (Column 2, Lines 16-22). Said Flakes are understood to present a "decorative outline" when viewed from "the top".

3. The glass flakes are loaded or "packed" into a mold having a mold release agent coated on the bottom plate (Column 2, Lines 39-40) to form a layer of said flakes followed by loading a layer of glass balls over the flake glass layer (Column 2, Lines 33-41). The instant figure 1 clearly shows that the flat pieces are spaced apart from one another in a "flat" orientation upon the floor of the mold.

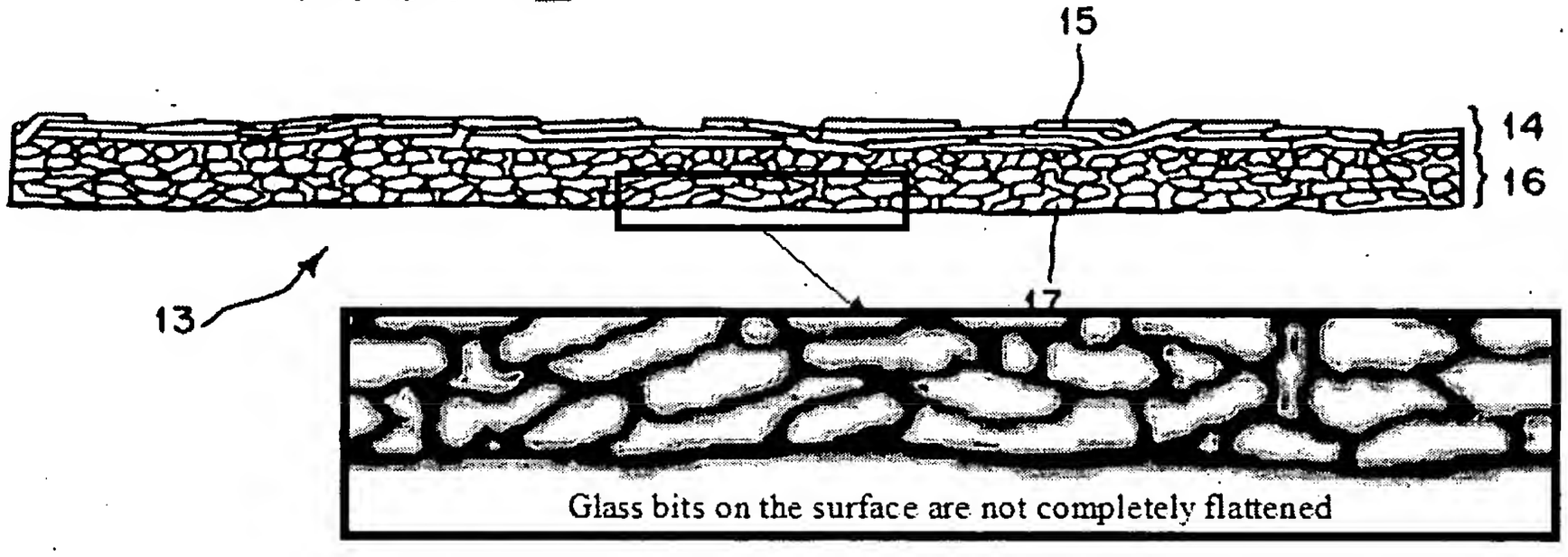
4. Heat-treating the glass flakes and balls to a temperature of 1000°C to 1200°C which is higher than the softening point of the crystallizable or crystallized glass (Column 2, Lines44-46). Said heat treatment causes the fusion-bonding of the flakes and balls (Column 2, Lines 46-49) as well as causing the softening and deformation (Column 1, Lines 57-62) of both the glass flakes and glass balls. Further, the heat treatment results in a densified or non-porous layer in the crystallized glass plate (Column 2 Lines 63-65).

5. Hashibe further indicates that the produced plate has a thickness of between 0.1mm-5mm (Column 2, Lines 26-27) and that the ratio of flaky pieces to small masses is 3:7 or 70% small masses by volume (Column 4, Lines3-10). With the assumption that the density of the small masses does not appreciably change upon heating, a plate thickness of 5mm would yield a small mass or "glass bit layer" at least 5mm * 0.7 or approximately 3.5 mm thick. The Hashibe process is therefore understood to disclose a layer that will "shrink" upon heat treatment to cover the flat crystallized glass pieces placed on the floor of the mold by at least 0.5mm.

With respect to Claim 1 and in accord with the Hashibe teachings set forth above, it is understood that the instant reference lays out a process of providing crystallizable glass bits, packing the bits into a mold to form a layer, heat treating the

mold at a temperature to fusion-bond and crystallize the glass bits, and heat treating at a sufficiently high temperature such that the glass flows to form a dense product (e.g. fills in the voids among the glass bits). Further, the immediate reference is understood to provide a final product with a roughened surface, and it is clear from Figure 2 that the heat treatment process is stopped before all of the individual glass bits have flattened:

FIG. 2



With respect to the heat treatement process set forth by Hashibe, the instant reference is silent regarding the "liquidus temperature" of the glass pieces. The reference is likewise silent regarding Applicants disclosed limitation wherein the heat treatment process is terminated at an elapsed process time such that the cooled body will have a top surface with bumps with height greater than 0.5mm. Finally with respect to the dependent claim 6 limitation, Hashibe is silent regarding the step of polishing the cooled glass article to provide a nominally flat surface and "unpolished craters with a depth of 0.2 to 0.5 mm".

Similarly regarding Claim 7, Hashibe teaches a first step of placing the flat glass pieces or "flakes" on the mold over the mold release agent to forma a layer of said pieces. This first layer is covered with a second layer of "glass bits" that "shrink" to

"approximately as thick as the height of the flat crystallized glass pieces" (see Fig 1 vs. Fig 2). Hashibe does not specifically limit the arrangement of the flat pieces which are placed upon the floor of the mold to be "spaced apart and placed flat". Further as set forth above, Hashibe is silent regarding the "liquidus temperature", the surface roughness of the final cooled sheet or the details of a subsequent polishing step performed upon the cooled sheet and the surface morphology resulting from said polishing step.

As set forth above and in the prior Office Action dated, Hashibe fails to explicitly assert that the that the heat treatment should be performed at a temperature that meets or exceeds the "liquidus" temperature of the glass bits and pieces as set forth in both immediate claims. Nakamura teaches multiple "marble-like" glass compositions in Table 1 (see excerpt below,) which fall within the compositional ranges as set forth by Hashibe in (1).

TABLE

Batch No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SiO_2	59.1	58.4	61.6	61.7	59.7	63.9	60.6	56.6	59.0	59.0	59.0	59.0	60.7	59.0
Al_2O_3	6.8	8.9	7.1	7.1	6.9	5.3	7.0	6.5	6.8	6.8	6.8	6.8	6.8	6.8
CaO	19.1	21.8	20.0	20.0	19.3	19.5	19.6	18.3	19.1	19.1	19.1	19.1	20.8	19.1
K_2O	1.6	1.8	1.7	1.7	1.6	1.8	1.7	1.6	1.6	1.6	1.6	1.6		
Na_2O	1.7	1.8	1.8	1.8	1.7	1.8	3.5	1.7	1.7	1.7	1.7	1.7		
B_2O_3	0.6	2.2		0.6	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
ZnO	6.8	5.1	7.8	7.1	9.9	7.1	7.0	6.5	6.8	6.8	6.8	6.8	6.8	6.8
BaO	4.3							8.2	4.2	4.3	4.3	4.2	4.3	4.2
Other									0.2 CuO	0.1 NiO	0.1 CoO	0.2 Fe_2O_3		3.5 Fe_2O_3
Fusion temp. °C	1440	1395	1430	1435	1440	1495	1425	1425	1440	1440	1440	1440	1450	1430
Molding temp. °C	1290	1270	1290	1295	1275	1330	1270	1265	1290	1290	1290	1290	1295	1270
Liquidus temp. °C	1230	1225	1240	1220	1195	1245	1230	1220	1230	1230	1230	1230	1190	1185

Specifically, compositions 5, 13, and 14 all meet Hashibe's preferred composition (SiO_2 of 50-65%, Al_2O_3 of 3-13%, CaO of 15-25%, and ZnO of 2-10%). Each of these compositions also presents a liquidus temperature below 1200°C (see Table 1 excerpt) which is within the preferred heat treatment temperature range as described by Hashibe

in (4) above. Choosing any one of the aforementioned Nakamura compositions 14, 13, or 5 for use in the Hashibe process with a respective heat treatment temperature of 1185, 1190, or 1195°C, all of which are below the specified upper limit of 1200°C, reads on the present claims as heating the glass article at the liquidus temperature. Nakamura further asserts that since these compositions have relatively low fusion temperatures, greater differences between liquidus and molding temperatures and rapid crystal growth during reheating, marble-like bodies fabricated from these compositions are less costly that similar products made from other known compositions. It would have therefore been obvious to one of ordinary skill in the art to choose a glass composition of the type 5, 13, and 14 described by Nakamura for use in the Hashibe process in order to reduce the cost of the fabricated marble-like body.

A second divergence between the claimed subject matter and the teachings of Hashibe is that Hashibe fails to lay out a polishing step wherein the sharp bumps are removed from the molded and heat-treated glass article. Kurahashi does explicitly state is his description of forming a marble-like glass ceramic that after molding and fusion-bonding the crystallizable glass particles (Column 6, Lines 15-24), "the samples have excellent marble-like appearance **after surface (polishing)**" (Column 6, Lines 33-34). Here Kurahashi is understood to polish the as molded glass article in order to enhance the final surface appearance of the marble-like glass body.

On a final important note, Nakamura (US 3,955989) teaches the fabrication of a crystallized glass article having a surface pattern like granite, marble, or other natural stones. In the immediate disclosure, Nakamura clearly teaches that "**the evenness of**

the surface of the crystallized glass article is influenced mainly by the properties of the glass and the heat treatment schedule. More specifically, in case the temperature at which crystals begin to precipitate from the surface of small glass masses is higher by about 100oC than the softening point of the glass, the surface fo the resulting crystallized glass article tends to be relatively level and even. Further **in case the temperature-elevating rate is relatively low at the heat treating step, it is difficult to obtain an even surface. Of course, even in such case it is possible to obtain a product having a smooth surface free of small waves by polishing the surface."**

"[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."; see In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation (See In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)). **In the instant case, the surface roughness of the heat treated glass article is directly related to the conditions utilized in the heat treatment cycle as taught by Nakamura '989. Therefore surface roughness is deemed a result-effective variable of heating rate in the method of producing a crystallized article.**

As outlined above the surface roughness of the as produced glass object is a

recognized result effective variable of the heat treatment cycle. Similarly, it is well known to those skilled in the art to polish marble and marble-like materials to enhance the visual character and performance characteristics of the final article (also as per Nakamura '989). Therefore **absent any unexpected results**, it would have been obvious to one of ordinary skill in the art at the time of the invention to tailor the heating cycle to produce any reasonable surface roughness value in the final heat treated glass article. Similarly, it would have been obvious to one of ordinary skill in the art at the time of the invention to polish said heat treated glass article to any final surface roughness value as required by an end use application. With these points in mind, applicants disclosed limitations upon the process including forming "a top surface with bumps with height greater than 0.5mm", forming "raised portions on the upper surface over the flat pieces that are atleast 1 mm high", and/or polishing the cooled glass article such that the piece "retains unpolished craters with a depth of at least 0.2mm" or "with a depth between 0.2mm to 0.5mm" are **all deemed obvious over prior art teachings**.

Response to Arguments

Applicant's arguments filed October 10, 2006 have been fully considered but they are not persuasive. Applicant indicates in the reply the "flow deformation" will occur when utilizing the Nakamura (3,964,917) composition in the Hashibe process. It is here asserted that Hashibe-Nakamura ('917) in view of the teachings of Nakamura (3,955,989) renders obvious the process wherein temperature and duration of flow deformation are controlled to provide a tailored surface roughness value in the final glass process. Although Nakamura '989 teaches the control of heating rate in order to

achieve an "even" surface, the fundamental relationship between heating cycle parameters and their effect upon the realized surface roughness value are clearly delineated by the instant reference. Therefore the combined teachings of Hashibe and the analogous prior art teachings laid out by Nakamura would have rendered the control over the temperature and duration of flow deformation as an obvoius means to impact the flattening of the surface glass granules.

Applicant is directed to the above rejection under 35 USC 103(a) for any argument not explicitly addressed above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571) 272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL

DIONNE A. WALLS MAYES
PRIMARY EXAMINER